

OBJECTIVES

The present study was undertaken to resolve the following questions concerning the shallow-water disposal of dredged materials in the northern portion of the North Landing River.

1. What are the sedimentological characteristics of surface and shallow subsurface sediments?
2. What are the concentrations and distributions of heavy metal contaminants within the bottom sediments?
3. Could trace element contaminants in the sediments be re-introduced into Currituck Sound through the processes of open-water disposal of dredged materials?
4. Are any toxic trace element contaminants being transported from the Norfolk harbor area, down the Waterway and into Currituck Sound?
5. Could shallow, open-water disposal of dredged materials from routine channel maintenance contribute to the long-term environmental degradation in Currituck Sound?

NORTH LANDING RIVER STUDY AREA

Only a small portion of Currituck Sound was included in this study (Fig. 1) due to the specific objectives of Currituck County and the very limited funds available. The study area is the northwestern end of Currituck Sound where it narrows down to form the North Landing River estuary. The study area (Figs. 2 and 3) extends from Gibbs Point, Faraby Island, and Sandy Point in North Carolina (Intracoastal Waterway marker "67"), northward into Virginia to 0.4 miles north of the Pungo Ferry bridge (midway between Intracoastal Waterway markers "40" and "41").

The North Landing River is an embayed estuary which narrows and grades into a riverine environment just north of the study area (Fig. 2). The eastern shore of the North Landing River is dominated by low sediment bank shorelines with scattered areas of low-density residential housing and agricultural operations. The western shore is dominated by many tributary creeks and an extensive zone of fresh water marshes that vary from 0.5 to 1.25 miles in width. The North Landing River estuarine system is characterized by fresh water, irregular wind tides, strong wind-tide currents, and by generally small wave energy due to the small fetch.

Circulation in Currituck Sound is primarily driven by direction and magnitude of winds with the SSW and NNE wind directions being the most important (Pietrafesa and Janowitz, 1991). Southerly winds push water into Currituck Sound from Albemarle Sound, whereas northerly winds blow the water out of Currituck Sound. The resulting tilt in the water surface sets up major pressure gradients and produces strong currents. Due to the shallow nature of much of the study area and the very narrow dimensions through specific portions of the waterway such as the North Landing River, Coinjock Bay, and